

Public Briefing July 2005 Groundwater cleanup at Main Installation

This winter, environmental contractors at the former Memphis Depot will begin cleaning up affected groundwater under the Main Installation.

As outlined in the Main Installation Record of Decision (ROD), which was finalized in 2001, the Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC) approved Enhanced Bioremediation Treatment (EBT) as the groundwater remedy for the Main Installation.

The Depot's environmental contractors completed a pilot study in 2003, to confirm EBT as a cost-effective solution for treating solvents in the shallow groundwater aquifer beneath the Main Installation.

The results of the pilot study were used to complete the Main Installation Remedial Design (RD), which outlines the technical specifications and schedule for groundwater cleanup on the Main Installation. **A public briefing has been scheduled for Thursday, July 21, 2005, at 6 p.m.** at the South Memphis Senior Citizens Center to provide details of the RD to the community.

"Our objective is to ensure the solution meets the cleanup criteria defined in the Record of Decision," said Michael Dobbs, Environmental Program Manager for the Defense Distribution Center and BRAC Cleanup Team member. "The groundwater remedy is designed to restore groundwater in the shallow aquifer to drinking

water standards, even though it is not a source of drinking water for the community."

Drinking water in Memphis/Shelby County is taken from the Memphis Sand Aquifer, which is much deeper below ground surface and has not been affected by past operations at the Depot.

The Main Installation Remedial Design is available for public review at the Depot's Information Repositories. The date and location of the Public Briefing will be announced in the local media. For more information, call the Community Relations Office at (901) 774-3683.

EBT and ZVI Environmental cleanup technologies

The Depot is using leading-edge environmental technologies to restore affected soil and groundwater at the former Memphis Depot. This article explains the science behind two of those approved technologies – Enhanced Bioremediation Treatment (EBT) and Zero-Valent Iron (ZVI) injection.

Enhanced Bioremediation Treatment (EBT):

Scientists have discovered naturally occurring organisms present in the environment that can help to break down chlorinated solvents in groundwater, and turn them into safe, natural compounds. This process is known as bioremediation.

Enhanced bioremediation involves injecting natural nutrients into the groundwater as an additional food source for these tiny organisms. This speeds up the natural process by encouraging the growth and development of more organisms. EBT has been used successfully at hundreds of cleanup sites across the country.

During a year-long pilot study completed in 2003, the Depot's environmental team set up two test sites where organic nutrients were injected into the groundwater. Vegetable oil was used at one site and sodium lactate was used at the other, to compare the effectiveness of the substances. The results of the study showed that multiple injections of sodium lactate will be the most effective solution for treating solvents in the shallow aquifer beneath the Main Installation (MI).

EBT will be used in two areas of the MI where concentrations of solvents are the highest. In the southwest corner, 16 injection wells will be used to introduce sodium lactate into the groundwater. In the southeast corner, nine injection wells will be used. Injections will occur bi-weekly during the first year of treatment and then reduce to a monthly schedule until the cleanup goals are reached.

Additional monitoring wells will also be installed to ensure the effectiveness of the treatment.

The Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC) will review the effectiveness of the remedy at five-year intervals to ensure the site continues to be safe for community reuse.

The Depot will host a public briefing for the MI Remedial Design on July 21, 2005, and will provide more information on EBT and its use at the Memphis Depot. An announcement will be placed in the local media before the briefing. More information on EBT is available on EPA's website at www.epa.gov/swertio1/download/citizens/bioremediation.pdf.

Zero-Valent Iron (ZVI):

In February 2005, the Depot hosted a Community Information Session featuring a special guest speaker, Dr. Ralph Ludwig, who described how ZVI works, and provided examples from other sites where the technology has been used with great success.

Dr. Ludwig has a Ph.D. in environmental engineering from McGill University in Canada. He is a senior scientist with the U.S. EPA's Office of Research and Development, at the Ground Water and Ecosystems Restoration Division (GWERD) in Ada, Oklahoma.

As Dr. Ludwig explained during his presentation, ZVI has been used since the early 1990s to treat groundwater containing solvents known as chlorinated volatile organic compounds (CVOCs).

When ZVI is injected into groundwater, the iron slowly oxidizes, or rusts, and releases electrons that react with the chlorinated solvents in groundwater. A chemical reaction occurs that removes the chlorines from the CVOCs, breaking down the solvents into harmless byproducts. This chemical reaction is called reductive dechlorination.

In 2004, the Depot's environmental team completed a Treatability Study at Dunn Field to confirm the effectiveness of ZVI technology on groundwater conditions at the Depot. The results of the study showed a significant reduction in CVOCs in the groundwater.

ZVI has been approved for use in two cleanup remedies:

- Source Area Remedial Action: ZVI will be injected directly into areas at Dunn Field with the highest concentrations of solvents;
- Off-Depot Groundwater Remedial Action: ZVI will be used in a Permeable Reactive Barrier to treat groundwater, with lower concentrations of solvents, flowing off-site to the west of Dunn Field.

ZVI was used from November 2004 to January 2005 during an early remedy implementation to treat off-site impacts of solvents in groundwater beneath Memphis, Light, Gas and Water (MLGW) property northwest of Dunn Field. Sampling in January and March 2005 indicated that concentrations of solvents have been reduced by 50 per cent. Groundwater monitoring will continue and the information will be used in the Off Depot Groundwater Remedial Design.

EPA and TDEC will review the effectiveness of this remedy through regular monitoring that will be conducted once implementation has been completed. Additional review will also take place every five years as part of the Five-Year Review process that happens at all sites on the National Priorities List to ensure the site continues to be safe for community reuse. □

Cleanup program on schedule

The environmental cleanup program at the former Memphis Depot is now in the final stages of the eight-stage process outlined in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The Remedial Designs for the Main Installation and for the Dunn Field Disposal Sites have been completed, and Remedial Action (RA) is now underway at the disposal sites. Remedial Design is continuing for the Dunn Field Source Areas and Off-Depot Groundwater. The cleanup team has set the following schedule for these program milestones: